FORM PTO-1390 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371	ATTORNEY'S DOCKET NUMBER: B-0494 U.S. APPLN. NO. (If known, see 37 CFR 1.5) 10/019573

INTERNATIONAL APPLICATION NO.:	INTERNATIONAL FILING DATE:	PRIORITY DATE CLAIMED.
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TITLE OF INVENTION. DEVICE FOR THE CATALYTIC TREATMENT OF THE EXHAUST GASES OF A MOTOR VEHICLE ENGINE

APPLICANT(S) FOR DO/EO/US: Saïd BOUTRIF, Frédéric NOVEL-CATTIN, André WALDER, Brigitte MARTIN

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [X] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   - a. [X] is transmitted herewith (required only if not transmitted by the International Bureau).
   - b. [ ] has been transmitted by the International Bureau. (see attached copy of PCT/IB/308)
   - c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   - a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   - b. [ ] have been transmitted by the International Bureau.
   - c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   - d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U S.C. 371(c)(3)).
9. [ ] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] A translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Item 11. to 16. below concern document(s) or information included:

11. [X] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A **FIRST** preliminary amendment.
    [ ] A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. [ ] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [X] Other items or information:

International Search Report
PCT/IPEA/409
Application Data Sheet

U.S. APPLICATION NO (If known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NO
10/019573	PCT/FR00/01787	B-0494

17. [X] The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):
Neither international preliminary examination fee (37 CFR1.482) nor international search fee (37 CFR1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... $ 1,040.00
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... $ 890.00
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... $ 740.00
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... $ 710.00
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) ..... $ 100.00

	CALCULATIONS PTO USE ONLY
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 890.00
Surcharge of $130.00 for furnishing the oath or declaration later than 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 130.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	$
Total claims	11 - 20 =	0	X $18.00	$
Independent claims	1 - 3 =	0	X $84.00	$
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)			+ $280.00	$

TOTAL OF ABOVE CALCULATIONS =	$ 1,020.00
Reduction of ½, if applicant is entitled to Small Entity status under 37 CFR 1.27. +	$
SUBTOTAL =	$ 1,020.00
Processing fee of $130 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR1.492(f)).	$
TOTAL NATIONAL FEE =	$ 1,020.00
Fee for recording the enclosed assignment (37 CFR1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) $40.00 per property +	$
TOTAL FEES ENCLOSED =	$ 1,020.00
Amount to be refunded.	
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a. [X] A check in the amount of $ **1,020.00** to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. **25-0120** in the amount of $ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required by 37 CFR 1.16 and 1.17, or credit any overpayment to Deposit Account No. **25-0120**. A duplicate copy of this sheet is enclosed.

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December 31, 2001

By _____
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Saïd BOUTRIF et al.

Serial No. (unknown)

Filed herewith

DEVICE FOR THE CATALYTIC TREATMENT OF THE EXHAUST GASES OF A MOTOR VEHICLE ENGINE

PRELIMINARY AMENDMENT

Commissioner for Patents

Washington, D.C. 20231

Sir:

Prior to the first Official Action and calculation of the filing fee, please substitute Claims 1-12 as originally filed, with Claims 1-11 as filed in the Article 34 amendment of May 21, 2001. The pages containing Claims 1-11 are marked "AMENDED SHEET" and are attached hereto. Following the insertion of Claims 1-11, please amend these claims as follows:

IN THE CLAIMS:

Amend the claims as follows:

--2. (amended) Treatment device (10) according to claim 1, characterized in that an upstream transverse end face (32) of the block of fibres is positioned against an upstream annular entrance flange of the chamber (16).--

--3. (amended) Treatment device (10) according to claim 1, characterized in that a downstream transverse end face (48) of the block (18) forms a second outlet surface for the gases (G) treated by the block (18).--

--4. (amended) Treatment device (10) according to claim 1, characterized in that a downstream transverse end face (48) of the block is closed and impermeable to the gases treated by the block, so that the gases (G) diffuse only towards the peripheral wall (44) of the treatment chamber (16).--

--5. (amended) Device (10) according to claim 1, characterized in that the conical cavity (26) extends axially for only part of the length of the block (18) of fibres.--

--6. (amended) Device (10) according to claim 1, characterized in that the conical cavity (26) extends axially for the whole length of the block (18) of fibres.--

--7. (amended) Device (10) according to claim 1, characterized in that the treatment chamber (16) is essentially cylindrical and coaxial with the gas (G) admission (12) and evacuation (14) pipes, and in that the block (18) of fibres is cylindrical and mounted coaxially inside the treatment chamber (16), the axial length of the block (18) of fibres being less than that of the chamber (16).--

--8. (amended) Treatment device (10) according to claim 7, characterized in that the cylindrical block (18) of fibres is mounted coaxially in the treatment chamber (16) by

means of a complementary cylindrical supporting housing (38) that is mounted to the inside of the treatment chamber (16) by an upstream edge (40) and by at least three radial centring lugs (42) interposed between the outer wall (50) of the housing (38) and the inner wall (44) of the chamber (16).--

--9. (amended) Device (10) according to claim 8, characterized in that the peripheral wall (50) of the supporting housing is pierced so that the gases (G) treated by the block (18) can pass through it.--

--10. (amended) Device (10) according to claim 8, characterized in that the supporting housing (38) comprises a downstream transverse grating adjacent to the downstream transverse end face (48) of the block (18) forming the second outlet surface for the treated gases (G).--

--11. (amended) Device (10) according to claim 7, characterized in that the chamber (16) is of frustoconical shape on the downstream side to form a funnel feeding into the exhaust gas (G) evacuation pipe (14) and promote the flow of treated gases (G).--

R E M A R K S

The above changes in the claims merely place this national phase application in the same condition as it was during Chapter II of the international phase, with the multiple dependencies being removed. Following entry of this amendment by substitution of the pages, only claims 1-11 remain pending in this application.

Saïd BOUTRIF et al.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE".

Respectfully submitted,

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December 31, 2001

VERSION WITH MARKINGS TO SHOW CHANGES MADE

2. (amended) Treatment device (10) according to ~~the previous~~ claim 1 , characterized in that an upstream transverse end face (32) of the block of fibres is positioned against an upstream annular entrance flange of the chamber (16).

3. (amended) Treatment device (10) according to ~~either of Claims~~ claim 1 ~~and 2~~ , characterized in that a downstream transverse end face (48) of the block (18) forms a second outlet surface for the gases (G) treated by the block (18).

4. (amended) Treatment device (10) according to ~~either of Claims~~ claim 1 ~~and 2~~ , characterized in that a downstream transverse end face (48) of the block is closed and impermeable to the gases treated by the block, so that the gases (G) diffuse only towards the peripheral wall (44) of the treatment chamber (16).

5. (amended) Device (10) according to ~~any one of the previous claims~~claim 1, characterized in that the conical cavity (26) extends axially for only part of the length of the block (18) of fibres.

6. (amended) Device (10) according to ~~any one of Claims~~claim 1 ~~to 4~~, characterized in that the conical cavity (26) extends axially for the whole length of the block (18) of fibres.

7. .(amended) Device (10) according to ~~any one of the previous claims~~claim 1, characterized in that the treatment chamber (16) is essentially cylindrical and coaxial with the gas (G) admission (12) and evacuation (14) pipes, and in that the block (18) of fibres is cylindrical and mounted coaxially inside the treatment chamber (16), the axial length of the block (18) of fibres being less than that of the chamber (16).

8. (amended) Treatment device (10) according to ~~the previous~~ claim 7, characterized in that the cylindrical block (18) of fibres is mounted coaxially in the treatment chamber (16) by means of a complementary cylindrical supporting housing (38) that is mounted to the inside of the treatment chamber (16) by an upstream edge (40) and by at least three radial centring lugs (42) interposed between the outer wall (50) of the housing (38) and the inner wall (44) of the chamber (16).

9. (amended) Device (10) according to ~~the previous~~ claim 8, characterized in that the peripheral wall (50) of the supporting housing is pierced so that the gases (G) treated by the block (18) can pass through it.

10. (amended) Device (10) according to ~~one of claims~~claim 8 ~~or 9 taken in combination with Claim 3~~, characterized in that the supporting housing (38) comprises a downstream transverse grating adjacent to the downstream

transverse end face (48) of the block (18) forming the second outlet surface for the treated gases (G).

11. (amended) Device (10) according to ~~any one of Claims~~ claim ~~7 to 10~~, characterized in that the chamber (16) is of frustoconical shape on the downstream side to form a funnel feeding into the exhaust gas (G) evacuation pipe (14) and promote the flow of treated gases (G).

Device for the catalytic treatment of the exhaust gases of a motor vehicle engine

The invention relates to a device for the catalytic treatment of the exhaust gases of a motor vehicle engine.

The invention relates more particularly to a device for the catalytic treatment of the exhaust gases of a motor vehicle engine, of the type that comprises an upstream pipe for admission of the exhaust gases and a downstream pipe for evacuation of the exhaust gases, between which pipes is an essentially longitudinal gas treatment chamber that comprises a catalytic treatment means based on metallic fibres traversed by the gases.

Many examples of gas treatment devices for cutting polluting emissions by catalytic treatment of the gases are known.

These devices for treating exhaust gases are widely employed in all types of motor vehicles in order to comply with current environmental regulations.

Conventionally, these are devices in which the gas treatment means are formed by a block of material having catalytic properties, more commonly known by the name "monolith".

The exhaust gases are fed into the gas treatment chamber by the admission pipe, flow through the monolith and are evacuated from the gas treatment chamber by the evacuation pipe.

One type of monolith made in the form of "honeycombed" blocks of cellular ceramic substrate containing several thousands

of cells in the form of fine channels is known. The ceramic substrate is made from a paste containing silicon, aluminium and magnesium, often a ceramic compound such as magnesium aluminium silicate, also known as "cordierite", which is formed and then dried and annealed. The ceramic walls are impregnated with a "washcoat" of aluminium oxide which is highly fissured to increase the surface area available for exchange with the exhaust gases, and covered with the catalytic material that enables conversion of the pollutants.

These monoliths have the drawback of presenting a large counterpressure to the flow of the exhaust gases.

Furthermore, their heat capacity is large, so they are usually slow to reach an operating temperature adequate to cause efficient catalysis of the exhaust gases.

Lastly, they are vulnerable to high temperatures and pulsation of the gases, either because of their sensitivity to thermal shock, or because of their relatively low melting point, which is around 1350°C as against 1450°C for the ferritic stainless steels (Fe-Cr-Al). They must therefore be supported inside the gas treatment chamber by a thermoexpansible mat which is generally made from ceramic fibres or steel wool.

To solve these problems, proposals have been made for monoliths of a second type, comprising a "honeycombed" cellular metallic reinforcement to replace the ceramic substrate described earlier.

These monoliths are lighter, less sensitive to thermal and mechanical shock, and reach the temperature of catalysis more quickly, but they are more expensive.

To solve this problem, it has been proposed that monoliths be made of the type described earlier, that is to say monoliths made from metallic fibres that have the advantage over honeycombed cellular substrates of setting up a turbulent flow of the exhaust gases through the gas treatment chamber; this consequently enhances gas stirring and pollutant conversion.

However, it has been found that fibres made from metal wire result in a gas treatment block which, while causing turbulent flow of the exhaust gases inside the gas treatment chamber, as is favourable to the conversion of the pollutants, nevertheless has the disadvantage of presenting a large counterpressure to the flow of the exhaust gases, and this is harmful to good operation of the motor vehicle.

To solve this problem, the invention provides for the use of an arrangement of fibres that causes very little disturbance to the exhaust gas flow because its geometry allows the gases to traverse the entirety of the block of fibres. This means that only a small volume of fibres need be used to treat the exhaust gases, and, consequently, there is no large counterpressure against the flow of exhaust gases.

To this end, the invention provides a device for the treatment of the exhaust gases of a motor vehicle engine, of the type described earlier, characterized in that the catalytic treatment means is a block of metallic fibres impregnated with a catalytic compound which is arranged inside the treatment chamber and which comprises at least one upstream admission cavity of conical or frustoconical shape, supplied directly by the gas admission pipe which feeds into the base of the cavity, and

whose concave envelope forms the entrance surface for the gases to be treated in the block of fibres.

In accordance with other characteristics of the invention:

- the block of fibres is housed transversely with clearance in the longitudinal treatment chamber in such a way that the peripheral surface of the block forms a first outlet surface for the gases treated by the block,

- an upstream transverse end face of the block of fibres is positioned against an upstream annular entrance flange of the chamber,

- a downstream transverse end face of the block forms a second outlet surface for the gases treated by the block,

- a downstream transverse end face of the block is closed and impermeable to the gases treated by the block, so that the gases diffuse only towards the peripheral wall of the treatment chamber,

- the conical cavity extends axially for only part of the length of the block of fibres,

- the conical cavity extends axially for the whole length of the block of fibres,

- the treatment chamber is essentially cylindrical and coaxial with the gas admission and evacuation pipes, and the block of fibres is cylindrical and mounted coaxially inside the treatment chamber, the axial length of the block of fibres being less than that of the chamber,

- the cylindrical block of fibres is mounted coaxially in the treatment chamber by means of a complementary cylindrical supporting housing that is mounted to the inside of the treatment chamber by an upstream edge and by at least three radial centring lugs interposed between the outer wall of the housing and the inner wall of the chamber,

- the peripheral wall of the supporting housing is pierced so that the gases treated by the block can pass through it,

- the supporting housing comprises a downstream transverse grating adjacent to the downstream transverse end face of the block forming the second outlet surface for the treated gases,

- the chamber is of frustoconical shape on the downstream side to form a funnel feeding into the exhaust gas evacuation pipe and promote the flow of treated gases.

Other characteristics and advantages of the invention will become apparent on reading the following detailed description, for an understanding of which the appended drawings should be referred to, in which:

- Figure 1 is an axial longitudinal sectional view of a block of fibres in a first embodiment of a treatment device according to the invention;

- Figure 2 is an axial longitudinal sectional view of a first embodiment of the treatment device according to the invention;

- Figure 3 is a cross section on the plane 3-3 marked in Figure 2 of the first embodiment of the treatment device according to the invention;

- Figure 4 is an axial longitudinal sectional view of a block of fibres in a second embodiment of a treatment device according to the invention;

- Figure 5 is an axial longitudinal sectional view of a second embodiment of the treatment device according to the invention; and

- Figure 6 is a cross section on the plane 6-6 marked in Figure 5 of the second embodiment of the treatment device according to the invention.

In the following description, identical reference numbers denote identical parts or parts having similar functions.

Figures 2 and 5 show the entire device 10 for the catalytic treatment of the exhaust gases (G) of a motor vehicle engine constructed in accordance with the invention. Figure 2 illustrates the first embodiment of the invention and Figure 5 illustrates a second embodiment of the invention.

In a known manner, the device 10 comprises an upstream exhaust gas G admission pipe 12 and a downstream exhaust gas G evacuation pipe 14, and between these is a gas treatment chamber 16 comprising a means 18 for the catalytic treatment of the gases G.

In a known manner, the means 18 for the catalytic treatment of the gases is a block 18 of metallic fibres arranged inside the treatment chamber 16 between an orifice 20 leading into the chamber 16 from the gas G admission pipe 12 and a similar orifice 22 belonging to the gas G evacuation pipe 14.

The block of fibres 18 corresponding to the first embodiment illustrated in Figure 2 is depicted in Figure 1 while the block of fibres 18 corresponding to the second embodiment illustrated in Figure 5 is depicted in Figure 4.

As can be seen in these Figures 1 and 4, the block 18 preferably consists, in a known manner, of metallic fibres 24 produced for example by a direct-casting process also known as the "Melt Overflow" process. However, some other method may also be used.

The fibres 24 are made from an alloy based on iron, chromium and aluminium, the proportion of aluminium by weight being greater than or equal to 5%, and small concentrations of yttrium, rare earths, or mixtures of rare earths also known as "Mischmetall". These fibres 24 are collected in a mould corresponding in shape to the block 18, and welded together by an electric discharge. Finally the fibres 24 can be covered with a porous binder or "washcoat" that forms large binding surface areas on the surface of the fibres 24 and that is subsequently impregnated with a catalytic compound for the treatment of the gases G.

This arrangement does not of course restrict the invention, and any means of producing the fibres 24 and, more generally, the block 18 of metallic fibres, may be used to implement the present invention.

In the preferred embodiment of the invention, but without limiting the invention, the exhaust gas G treatment chamber 16 is essentially cylindrical and the block 18 of metallic fibres is also cylindrical with a diameter less than that of the treatment chamber 16 so as to fit inside it coaxially with clearance in the radial direction.

In accordance with the invention, and as shown in Figures 1, 2, 4 and 5, the block 18 of metallic fibres comprises at least one cavity 26 for admission of the exhaust gases G.

As seen in Figures 1 and 4, this cavity 26 is preferably conical but may also, without limiting the invention and as a variant (not shown), be frustoconical. The base of the conical shape of the cavity 26 is turned towards the upstream admission pipe 12 and the vertex of the conical shape of the cavity 26 is turned towards the downstream exhaust gas G evacuation pipe 14.

The cavity 26 extends axially within the cylindrical block 18 of the metallic fibres 24. As Figures 2 and 5 show more precisely, this cavity 26 is designed to be fed directly by the gas G admission pipe 12 whose orifice 20, which fits into an upstream annular entrance flange 28 of the chamber 16, also feeds into a base 30 of the cone or frustum of a cone of the cavity 26.

For this purpose an upstream transverse end face 32 of the block 18 of fibres is positioned against the upstream annular entrance flange 28 of the chamber 16.

Consequently the block 18 of fibres "closes" the orifice 20 of the entrance pipe 12 and a concave surface 34 of the cavity 26

of the block 18 of metallic fibres constitutes the surface via which the gases G to be treated enter the block of fibres.

The gases G to be treated thus enter the cavity 26, pass through the fibres 24 of the block 18 and out of the block 18 via at least one peripheral surface 36 of the said block 18.

Additionally, the cylindrical block 18 of fibres is mounted coaxially inside the treatment chamber 16 by means of a complementary cylindrical supporting housing 38 which is fixed inside the chamber 16 by an upstream edge 40 of the supporting housing 38 and by at least three radial centring lugs 42 interposed between the outer wall of the housing 38 and a cylindrical inner wall 44 of the chamber 16.

The supporting housing 38 is hollow, with an inside diameter approximately equal to the outside diameter of the block of fibres 18, so that the block of fibres 18 is held securely inside the supporting housing 38.

A peripheral surface 50 of the supporting housing 38, which is perforated, forms a first outlet surface for the treated gases G. In Figures 2 and 5 this peripheral surface 50 is shown in grating form but it may, as a variant, be an initially solid surface which, in the course of production, is pierced by multiple drillings.

In the first embodiment of the invention shown with reference to Figures 1 to 3, the conical cavity 26 extends axially for only part of the length of the block 18 of fibres and the cylindrical supporting housing 38 has a downstream transverse end face 46 that is adjacent to a downstream transverse end face 48 of the block 18 and that is constructed in the form of a grating so as to form a second outlet surface for the treated gases G.

This arrangement does not limit the invention and any means of making a second outlet surface for the treated gases G, such as a wall pierced with multiple holes, may be used.

In this way the exhaust gases G pass through the block 18 of fibres and escape partly through the peripheral wall 50 of the supporting housing 38 forming the first outlet surface of the gases (G), and partly through the grating of the downstream transverse end face 46 of the supporting housing 38 forming the second outlet surface for the gases.

Also, the supporting housing 38 is shorter than the treatment chamber 16 so as to create a pressure-relief chamber 52 beyond the downstream transverse end face 46 of the supporting housing 38 and upstream of the gas evacuation pipe 14. This satisfactorily silences the gas treatment device 10.

The silencing of the treatment chamber 16 is advantageously further improved by the fact that the diameter of the treatment chamber 16 is greater than that of the supporting housing 38. The exhaust gases G are thus emitted with a predetermined pulsation that depends on the speed at which the engine is turning, and they escape through the pierced peripheral wall 50 of the supporting housing 38. The peripheral inner wall 44 of the chamber 16 causes multiple reflections in the trains of waves associated with the gases G, and these reflections interfere with each other, thus helping to further improve the silencing of the treatment chamber 16.

Furthermore, in order to promote the flow of treated gases G, the chamber 16 is of a frustoconical shape on the downstream side so as to form a funnel 54 of which the smallest diameter

coincides with the orifice 22 of the evacuation pipe 14 of the treated gases G.

The chamber 16 may advantageously be designed in such a way that the gas pressure-relief chamber 52 is situated axially in the funnel 54, thus making for a highly compact treatment chamber 16.

Figures 4 to 6 illustrate a second embodiment of the invention in which the conical cavity 26 extends axially for the whole length of the block 18 of fibres.

In this configuration the block 18 of fibres is arranged inside the supporting housing 38 in an essentially similar way to the first embodiment described with reference to Figures 1 to 3, except for the fact that the downstream transverse end face 46 of the supporting housing 38 is a solid face impermeable to the exhaust gases G.

Thus, the exhaust gases G that enter the conical cavity 26 of the block 18 of fibres all escape from it via the pierced peripheral side wall 50 of the supporting housing 38 and diffuse towards the inner peripheral wall 44 of the treatment chamber 16.

This gives all the benefits of the interference effect caused by the multiple reflections of the waves, and so contributes to suitable silencing of the treatment device 10, while dispensing with the need for a grating on the downstream transverse end face 46. This helps to keep down the manufacturing costs of such a treatment device 10.

As in the first embodiment of the invention, the exhaust gases G are then conveyed, by the pressure inside the treatment

chamber 16, towards the gas pressure-relief chamber 52, and are then evacuated from the chamber 16 via the gas evacuation pipe 14.

These two embodiments do not restrict the invention and it is understood that any shape for the cross section of the treatment chamber 16 and/or the cross section of the supporting housing 38, or indeed for the fibre block 18, is admissible, provided that the block 18 fits with clearance inside the treatment chamber 16 and that it contains a conical or frustoconical cavity 26.

In particular, it would also be possible to envisage at least a third embodiment (not shown) in which the frustoconical cavity 26 extends axially for the whole length of the block of fibres 18 and in which the downstream transverse end face 46 is in the form of a grating, and a fourth embodiment (not shown) in which the conical cavity 26 extends axially for only part of the length of the block of fibres 18 and in which the downstream transverse end face 46 of the supporting housing 38 is impermeable to the exhaust gases G.

The device 10 thus comprises an arrangement of a block 18 of metallic fibres which is traversed in its entirety by the exhaust gases G arising from the engine of the vehicle, meaning that there is no need to provide a large-volume block 18 of fibres to achieve efficient catalytic treatment of the said gases G. This means that, compared with a conventional treatment device, the size, weight and cost of manufacture of such a treatment device 10 can be reduced significantly.

Finally, such an arrangement of the block 18 of fibres inside the treatment chamber 16 greatly promotes the flow of

exhaust gases G because they are carried very largely in the axial direction, and there is therefore only a slight counterpressure against the exhaust. This represents a clear advantage over conventional treatment devices which require the use of arrangements in which, in order to set up multiple turbulences to encourage the treatment of the gases, the flow of gases G is disturbed and a considerable counterpressure is set up against the exhaust.

CLAIMS

1. Device (10) for the catalytic treatment of the exhaust gases of a motor vehicle engine, of the type that comprises an upstream pipe (12) for admission of the exhaust gases (G) and a downstream pipe (14) for evacuation of the exhaust gases (G), between which pipes is an essentially longitudinal gas (G) treatment chamber (16) that comprises a catalytic treatment means based on metallic fibres (24) traversed by the gases (G), of the type in which
the catalytic treatment means is a block (18) of metallic fibres (24) impregnated with a catalytic compound which is arranged inside the treatment chamber (16) and which comprises at least one upstream admission cavity (26) of conical or frustoconical shape, supplied directly by the gas (G) admission pipe (12) which feeds into the base of the cavity (26), and whose concave envelope (34) forms the entrance surface for the gases (G) to be treated in the block of fibres, characterized in that the block (18) of fibres is housed transversely with clearance in the longitudinal treatment chamber (16) in such a way that the peripheral surface (36) of the block forms a first outlet surface for the gases (G) treated by the block (18).

2. Treatment device (10) according to the previous claim, characterized in that an upstream transverse end face (32) of the block of fibres is positioned against an upstream annular entrance flange of the chamber (16).

3. Treatment device (10) according to either of Claims 1 and 2, characterized in that a downstream transverse end face (48) of the block (18) forms a second outlet surface for the gases (G) treated by the block (18).

4. Treatment device (10) according to either of Claims 1 and 2, characterized in that a downstream transverse end face (48) of the block is closed and impermeable to the gases treated by the block, so that the gases (G) diffuse only towards the peripheral wall (44) of the treatment chamber (16).

5. Device (10) according to any one of the previous claims, characterized in that the conical cavity (26) extends axially for only part of the length of the block (18) of fibres.

6. Device (10) according to any one of Claims 1 to 4, characterized in that the conical cavity (26) extends axially for the whole length of the block (18) of fibres.

7. Device (10) according to any one of the previous claims, characterized in that the treatment chamber (16) is essentially cylindrical and coaxial with the gas (G) admission (12) and evacuation (14) pipes, and in that the block (18) of fibres is cylindrical and mounted coaxially inside the treatment chamber (16), the axial length of the block (18) of fibres being less than that of the chamber (16).

8. Treatment device (10) according to the previous claim, characterized in that the cylindrical block (18) of fibres is mounted coaxially in the treatment chamber (16) by means of a complementary cylindrical supporting housing (38) that is mounted to the inside of the treatment chamber (16) by an upstream edge (40) and by at least three radial centring lugs (42) interposed between the outer wall (50) of the housing (38) and the inner wall (44) of the chamber (16).

9. Device (10) according to the previous claim, characterized in that the peripheral wall (50) of the supporting housing is

pierced so that the gases (G) treated by the block (18) can pass through it.

10. Device (10) according to one of Claims 8 or 9 taken in combination with Claim 3, characterized in that the supporting housing (38) comprises a downstream transverse grating adjacent to the downstream transverse end face (48) of the block (18) forming the second outlet surface for the treated gases (G).

11. Device (10) according to any one of Claims 7 to 10, characterized in that the chamber (16) is of frustoconical shape on the downstream side to form a funnel feeding into the exhaust gas (G) evacuation pipe (14) and promote the flow of treated gases (G).

10/019573

ABSTRACT

The invention provides a device (10) for the catalytic treatment of the exhaust gases of a motor vehicle engine, of the type that comprises an upstream pipe (12) for admission of the exhaust gases (G) and a downstream pipe (14) for evacuation of the exhaust gases (G), between which pipes is a longitudinal gas (G) treatment chamber (16) that comprises a catalytic treatment means based on metallic fibres (24) traversed by the gases (G), characterized in that the catalytic treatment means is a block (18) of metallic fibres (24) impregnated with a catalytic compound which is arranged inside the treatment chamber (16) and which comprises at least one upstream admission cavity (26) of conical or frustoconical shape, supplied directly by the gas (G) admission pipe (12) which feeds into the base of the cavity (26), and whose concave envelope (34) forms the entrance surface for the gases (G) to be treated in the block of fibres.

Figure 2.

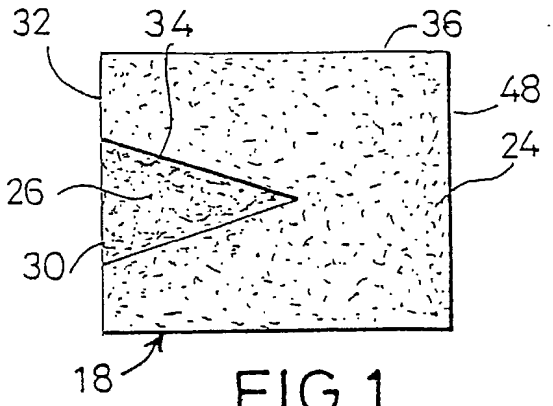


FIG.1

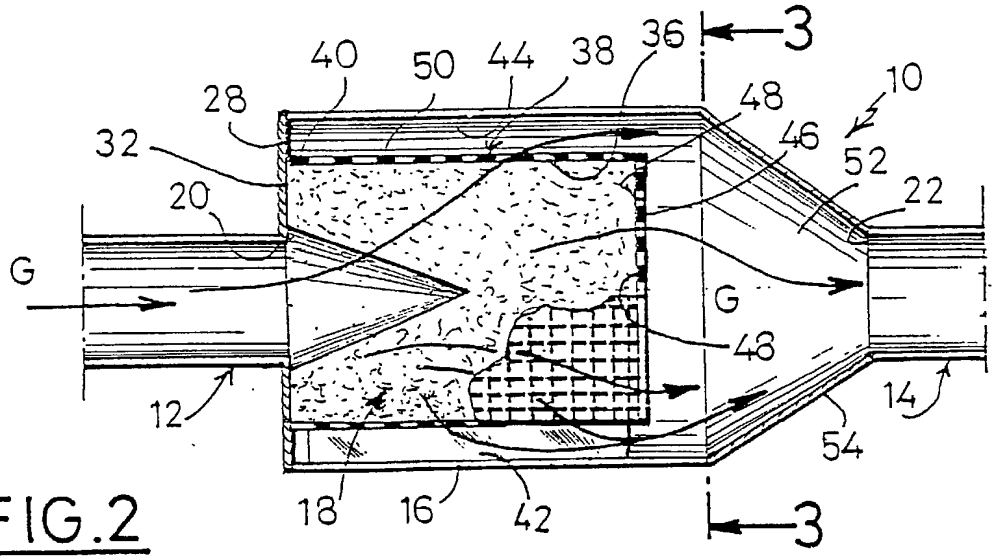


FIG.2

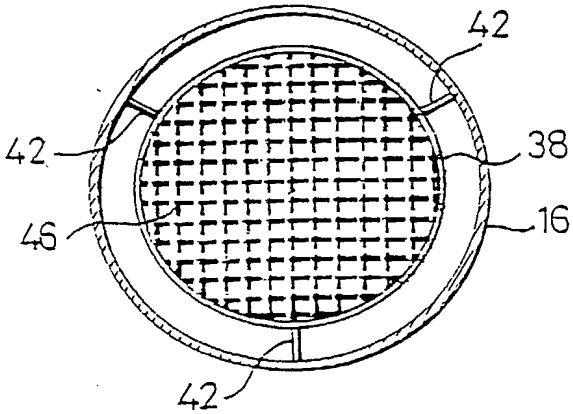
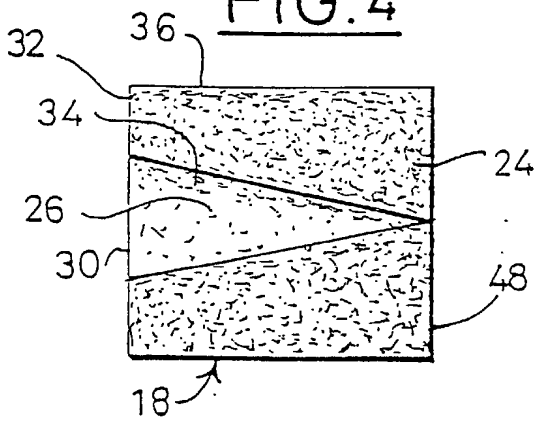


FIG.3

FIG.4



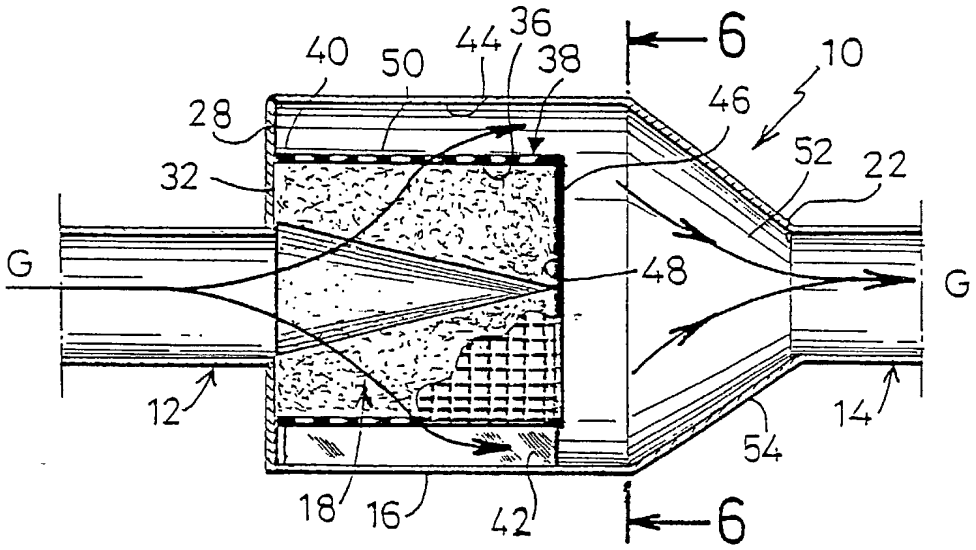


FIG.5

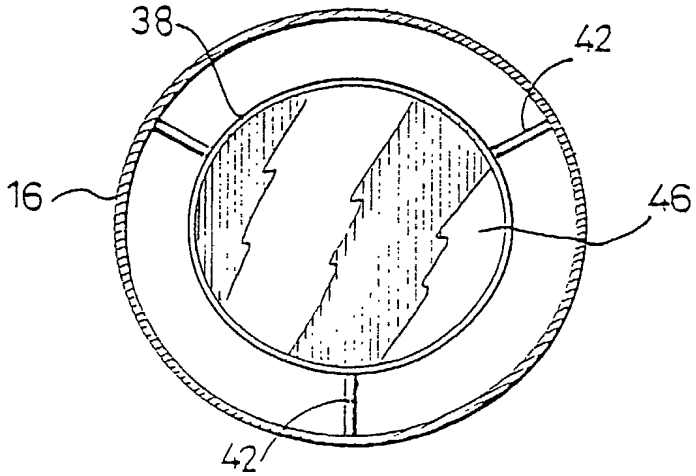


FIG.6

Ref. _____

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the specification of which: *(check one)*

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[ ] is attached hereto.

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France	**99 08287**	**29 JUNE 1999**	**YES**

(Complete this part only if this is a continuing application.)

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Full name of third joint inventor, if any: **BOUTRIF Saïd**
(given name, family name)

Inventor's signature _____ Date _____

Residence: 4 rue de Lille – F-54350 Mont St Martin (France)
Citizenship: French

Post Office Address: 4 rue de Lille – F-54350 Mont St Martin (France)

Full name of third joint inventor, if any: **NOVEL-CATTIN Frédéric**
(given name, family name)

Inventor's signature _____ Date _____

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Full name of sole or first inventor: **WALDER André**
(given name, family name)

Inventor's signature _____ Date _____

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94240 L'Hay les Roses (France)
Citizenship: French

Post Office Address: 20 allée Bertrand Dauvin - 94240 L'Hay les Roses (France)

2-00

Full name of second joint inventor, if any: **MARTIN Brigitte**
(given name, family name)

Inventor's signature Brigitte MARTIN Date 21/12/01

Residence: 63, rue Chemin de Putet
69230 Saint Genis Laval (France) FR

Citizenship: French

Post Office Address: 63, rue Chemin de Putet - 69230 Saint Genis Laval (France)

Ref.

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Inventor's signature _____ Date _____

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Citizenship: French

Post Office Address: 4 rue de Lille – F-54350 Mont St Martin (France)

3-00

Full name of third joint inventor, if any: **NOVEL-CATTIN Frédéric**
(given name, family name)

Inventor's signature _____ Date 11 déc. 2001

Residence: 1bis, rue Mouillon – F-92500 Rueil Malmaison (France) FRC

Citizenship: French

Post Office Address: 1bis, rue Mouillon – F-92500 Rueil Malmaison (France)

Full name of sole or first inventor: **WALDER André**
(given name, family name)

Inventor's signature _____ Date _____

Residence: 20 allée Bertrand Dauvin
94240 L'Hay les Roses (France)

Citizenship: French

Post Office Address: 20 allée Bertrand Dauvin - 94240 L'Hay les Roses (France)

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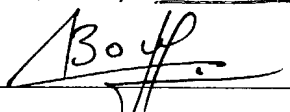
Inventor's signature  Date 14/12/2001.

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Citizenship: French

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(given name, family name)

Inventor's signature _____ Date _____

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10/089571 .042502 (4)

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1-00 Full name of sole or first inventor: **WALDER André**
(given name, family name)

Inventor's signature André Walder Date 13/12/01

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94240 L'Hay les Roses (France) JRK

Citizenship: French

Post Office Address: 20 allée Bertrand Dauvin - 94240 L'Hay les Roses (France)

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